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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,535	06/30/2003	Jim Wei	14386	8251

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EXAMINER

KALAFUT, STEPHEN J

ART UNIT PAPER NUMBER

1745

DATE MAILED: 06/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/608,535		WEI, JIM	
	Examiner		Art Unit	
	Stephen J. Kalafut		1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 23-26, 28-32, 34-36, 38, 40-46 and 48-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 27, 33, 37, 39 and 47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date (<u>3 dates</u>). | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1745

Applicant's election with traverse of the election of species requirement in the reply filed on 27 April 2006 is acknowledged. The traversal is on the ground(s) that the groups are so closely related that in searching for prior art for the first group, the examiner would be exposed to the other groups. This is not found persuasive because the other groups recite details such as seals with adjacent grooves, bridge members, or electrical conduit mounts that are not required by the first group, and would not necessarily be disclosed by references relating to a flow field as recited by the first group.

The requirement is still deemed proper and is therefore made FINAL.

Claims 23-26, 28-32, 34-36, 38, 40-46 and 48-51 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 27 April 2006.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6, 15-17, 19, 20, 27 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwase *et al.* (EP 924,785), cited by applicant.

Art Unit: 1745

Iwase *et al.* disclose a fuel cell including a membrane electrode assembly (section 0022), on either side of which are gas-impermeable reactant flow field plates that include rectangular planar, and thus generally flat, recessed surfaces (111, 211) surrounded by walls and with upstanding protrusions (113, 213). The recessed surfaces are connected to inlet (105) and outlet (108) conduits. The protrusions are arranged in columns and rows, including columns that are staggered (figures 4 and 33). The protrusions may have a shape that is rectangular (figures 2 –4) or circular (section 116, figure 25A) and are of the same height (section 0047), thus having surfaces lying in a common plane.

Claims 1-3, 6, 11, 16, 17, 19, 27, 33, 37, 39 and 47 rejected under 35 U.S.C. 102(b) as being anticipated by Surampudi *et al.* (US 2001/0050230), cited by applicant.

Surampudi *et al.* disclose a fuel cell including a membrane electrode assembly (section 0040), on either side of which are gas-impermeable reactant flow field plates (section 0146) that include rectangular planar, and thus generally flat, recessed surfaces (figure 6) surrounded by walls and with upstanding rectangular protrusions (608). The recessed surfaces are connected to inlet (602) and outlet conduits, and are arranged in columns and rows, which would place their lateral edges in a common plane. The plate may be made of graphite (section 0144). As seen in figures 14 and 15, the plate may include holes for mounting devices. Surampudi *et al.* also teach the input of pressurize air (section 0165), which would force the cathode gas to carry away water produced at the cathode, which includes a gas diffusion layer (section 0117).

Art Unit: 1745

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-13, 18, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwase *et al.*

Iwase *et al.* do not teach the recited types of materials for their flow field plate. While they teach conductive material, such as carbon (section 0042), they do not specify graphite, metal, a castable material, or a composite material. However, given their teaching for a material that is conductive, the ordinary artisan would be able to choose a material that would meet this needed property. The ordinary artisan would also be familiar with effect of the area of the area and spacing of the protrusions on fluid mechanics. Given the teachings of Iwase *et al.*, section 0047, the artisan would be able to determine an optimal height for the protrusions. For these reasons, these claims would be obvious over Iwase *et al.*

Claims 10, 12-14, 18, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi *et al.*

Surampudi *et al.* do not teach the recited types of materials for their flow field plate, other than the titanium coating (section 0151). They do not teach a material that is castable, metal or composite. However, given their teaching for a material that is conductive (section 0146), the ordinary artisan would be able to choose a material that would meet this needed property. The

Art Unit: 1745

ordinary artisan would also be familiar with effect of the area of the area and spacing of the protrusions on fluid mechanics. Given their teaching that each protrusion has a pressing area (608) that presses against a membrane electrode assembly (section 0139), the artisan would be able to determine an optimal height for the protrusions. For these reasons, these claims would be obvious over Surampudi *et al.*

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Iwase *et al.* or Surampudi *et al.*, each in view of Leger *et al.* (US 6,686,082).

These claims differ from each of Iwase *et al.* and Surampudi *et al.* by reciting that the recessed surface is shaped like a trapezium, with a width decreasing from the inlet opening to the outlet opening. Leger *et al.* disclose a fuel cell stack that includes flow fields having a trapezium shape (figures 2, 2' and 2''), which shape overcomes the problem arising from a constant cross section, which is the elevated pressure required thereby (column 1, lines 60-64). For this reason, it would be obvious to configure the recessed surfaces of either Iwase *et al.* or Surampudi *et al.* to a trapezium shape as shown by Leger *et al.*

Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi *et al.* in view of Rock (US 6,699,614).

While Surampudi *et al.* disclose conduits (606) between the inlet opening (602) and the recessed surface, and similar conduits (NOZZLE) between the recesses surface and the output opening (figure 6), they do not disclose a distribution area between the sets of conduits and the adjacent opening. Rock discloses an inlet distribution area (72) between an inlet opening and a

Art Unit: 1745

set of conduits leading to his flow field, and a similar outlet receiving area (74) between a set of outlet conduits and an outlet opening. Because these would help to equalize gas pressure going into or out of the flow field, it would be obvious to use the distribution area and receiving area of Rock with the inlet and outlet opening on the flow field plates of Surampudi *et al.*

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi *et al.* in view of Rock as applied to claim 7 above, and further in view of Leger *et al.*

This claim differs from the above combination by reciting the recessed surface has a width that decreases from adjacent the inlet opening to adjacent the outlet opening. Leger *et al.* disclose a fuel cell stack that includes flow fields having a trapezium shape (figures 2, 2' and 2''), which shape overcomes the problem arising from a constant cross section, which is the elevated pressure required thereby (column 1, lines 60-64). For this reason, it would be obvious to configure the recessed surfaces of Surampudi *et al.*, modified according to Rock, into a shape where the cross sectional area decreases from inlet to outlet as shown by Leger *et al.*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references marked with a "Y" on the search report have been reviewed. These references disclose individual channels that are tapered, or trapezium shaped, but not a recessed surface having several channels having a trapezium shape.

The disclosure is objected to because of the following informalities: The numeral 32 does not appear in figure 3, as indicated on page 18. Instead, the numeral 21 appears, which is

Art Unit: 1745

not identified with respect to this figure. The numerals 21, 29, 31, 33 and 35, appearing in figure 13, are not identified in the specification. The numerals 405, 450, 504, 550, 631, 663, 722 and 724, appearing in figure 14, are not identified in the specification. The numeral 622, mentioned on page 34, line 15, is not found in figure 28. The numerals denoting H₂ and H₂O conduits in figure 29 are reversed from the corresponding numerals on page 35. In figure 34, the numerals 422 and 720 may be reversed, because in the other figures, the opening 422 is directly across from the opening 428, whereas in figure 34, the opening 722 is directly across from the opening 428. The numerals 860 and 872, on page 45, lines 3 and 10, respectively, do not appear in figure 39. Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

sjk


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